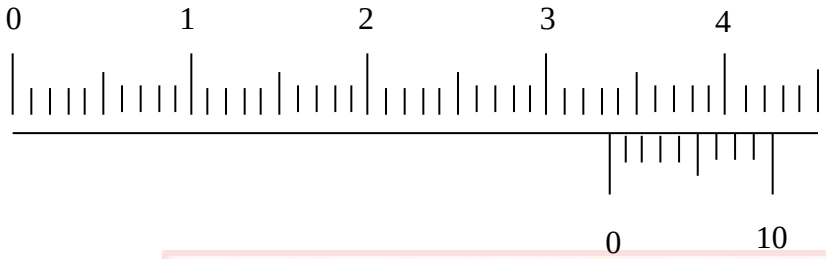
PHYSICS FORM 2

TERM 1 2023

MARKING SCHEME

SECTION A

1.



Check for correct drawing

Main scale 3.3 √

Vernier scale 0.06 √

2. Volume of water displaced = 100 – 60 = 40cm^3

Volume of water displaced = Vol. of stone = 40cm^3√

$P = \frac{M}{V}$ (do not award a mark for the formula)

$$P = \frac{567g}{40cm^3} = 14.175g/cm^3 \text{ (correct substitution)}\surd$$

$P = 14.18g/cm^3$ (Answer must be given correct to 2d. p)

3. Volume of drop = 5 x 10^{-8} M^3

   i. Area of circular film = 0.1M^2

   V = A x H

$$h = \frac{V}{A}\surd$$

$$\text{Size of molecule} = \frac{5 \times 10^{-8} m^2}{0.1 m^2}$$

$$= 5.0 \times 10^{-7} m\surd$$

Accept 0.0000005

Check for correct units.

ii. Atoms are spherical √

Mass uniformly distributes √

4. Weight on Earth = 600N

Weight on Planet = 450N

Weight, W = Mg

$$M = \frac{W}{g}$$

$$\text{Mass of body} = \frac{600N}{10N/Kg} = 60Kg\surd$$

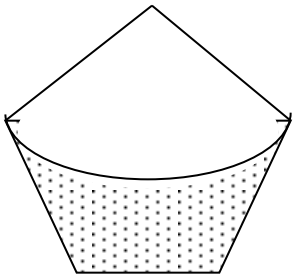
$$g = \frac{w}{m}$$

$$g = \frac{450N\surd}{60Kg} = \frac{7.5N}{Kg}\surd$$

Correct substitution √

Correct answer with correct units √

5. The force of cohesion within the mercury is greater than the force of adhesion between mercury and glass √. The mercury therefore sinks down √the tube to enable mercury molecules to keep together√.
6. Temperature rise and impurities lower the surface tension of water √
7. a)



Check for correct drawing √

Check on the curvature √

b) The unbalanced √ surface tension√ pulls the thread tight

8. h = 760mm

   $p = 1.36 \times 10^4$ Kg/m^3

   p = ?

   p = pgh

   $$p = 1.36\ x\ 10^4 x\ 10\ x\ \frac{760}{1000}$$

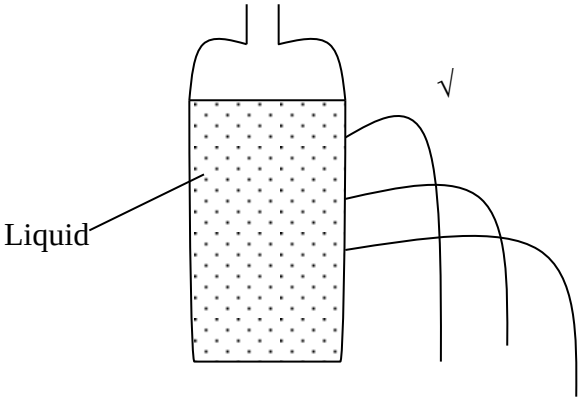
   Check on the conversion √

   Correct substitution √

P = 103,360 N/M^2

Accept P = 103,360 pa √ check for correct units

9. The external pressure (atmospheric) is lower than the internal pressure √: therefore the capillaries break √.
10. The bottle with hole experiment – if diagram used; check for labeling√: Procedure, observation and conclusion√.



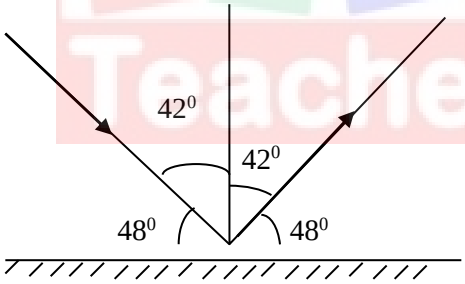
Lowest jet has highest pressure

11. Solid – particles very close, hence low kinetic energy√.

    Liquids – particles fairly free, moderate kinetic energy √

    Gases – particles very free, high kinetic energy √

12. The metal blade conducts heat from the hand but the wood cannot √

13. 

    $90 - 48 = 42^0$√

    Drawing a normal

14. (20 x 0.3) + (20 x 0.3)√ or 20 x 0.6

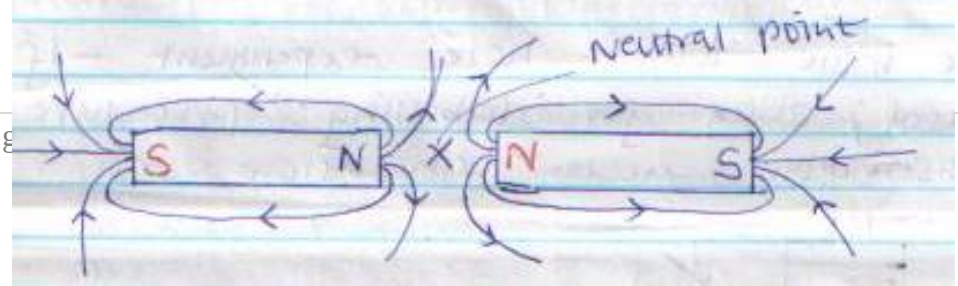
    6 + 6 = 12NM√

    Check for correct units

15. Unlike poles attract while like poles repel√

    Reject – unlike charges attract while like charges attract

    Reject – unlike terms attract while like terms attract



Check for direction of field √

Check for presence of the neutral zone√

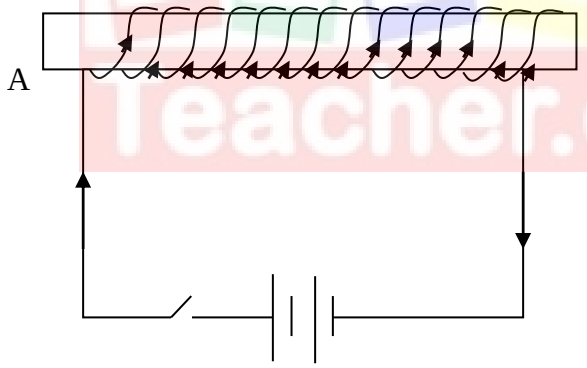
16. This is due to the influence of the Earth's magnetic field√

17. Repulsion only occurs between 2 like poles√ but attraction may occur between 2 unlike poles or between a magnet and a magnetic materials√

SECTION B

18. i. Iron is a soft magnetic material it can easily acquire magnetism and can easily lose magnetism.

ii. Check for correct direction



iii. A – North pole√

B – South pole √

iv. Right hard grip rule√

It states that if a coil carrying current is grasped in the right hand such that the fingers point in the direction of current then the thumb points in the direction of North Pole√.

ii. It would cause overheating on the electromagnet√. This adversely affects the magnetism of the electromagnet√.

19. i. Smoke particles – smoke particles are larger than air molecules and light enough to move when bombarded by air molecules √

Lens – focuses the light from the lamp on the smoke particles, causing them to be observable

Microscope – enlarges/magnifies the smoke particles so that they are visible √

ii. Smoke particles more randomly/zigzag √

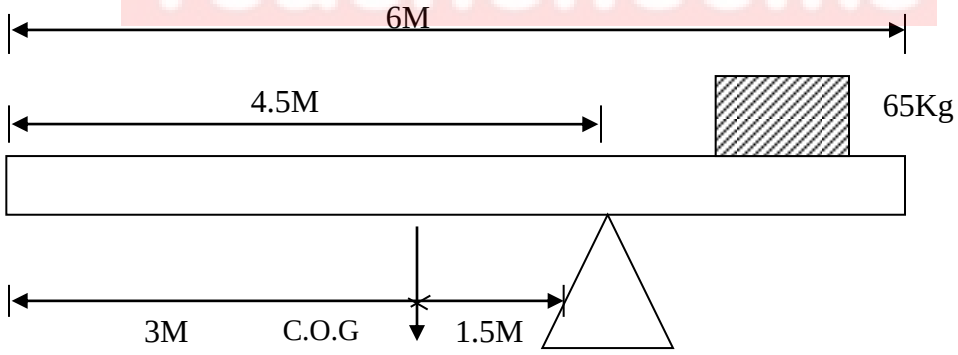
Air molecules bombard the smoke particles

Air molecules are in random motion

iii. The speed of motion of smoke particles will be observed to be lighter/faster/speed increases√.

20. a) Principle of moments states that for a system in equillbrium, the sum of clockwise moments must be equal to the sum of the anticlockwise moments.

b)



Clockwise moments = Anticlockwise moments

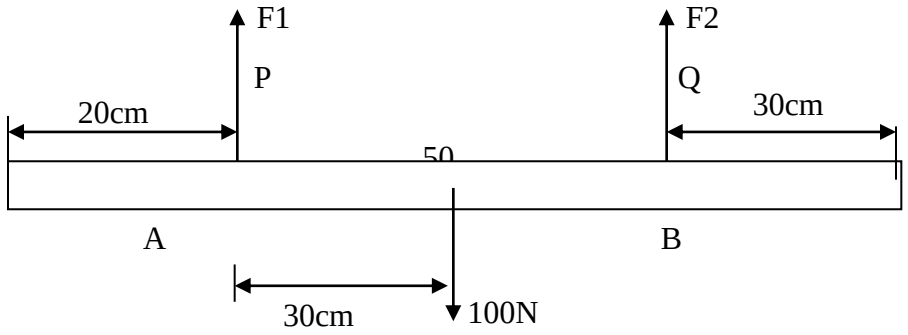
300 x 1.5 = X x 650√ (correct substitution 1mk)

$$\frac{450}{650} = \frac{650x}{650}$$

$$X = \frac{450}{650}\surd$$

X = 0.69M√

c)



Taking moments about P

Distance between P and Q = 100 – (20 + 30)

= 100 – 50√

= 50cm

= 0.5m

F2 x 0.5 = 0.3 x 100√

$$\frac{0.5\ F2}{0.5} = \frac{30}{0.5}$$

$$F2 = \frac{300}{5} = 60N\surd$$

Clockwise moments = Anticlockwise moments

F1 + F2 = 100N√

F1 + 60N = 100N

F1 = 100N – 60N

F1 = 40N√

21. a) Mass of water = 66.1 – 42.9√

= 23.2g√

b) $\text{Volume} = \frac{\text{Mass}}{\text{Density}} = \frac{23.2\text{g}}{1\text{g/cm}^3}$

= 23.2cm^3√

Working must be shown

c) Volume of density bottle = volume of water

Volume of bottle = 23.2cm^3√

d) Mass of soil = 67.2 – 42.9

= 24.3g √

e) Mass of water that filled the space above the soil

= 82.0 – 67.2

= 14.8g √

f) Volume of soil

Volume of water $= \frac{\text{Mass}}{\text{Density}}$√

$= \frac{14.8\text{g}}{1\text{g/cm}^3}$

= 14.8cm^3√

Volume of soil = 23.2 – 14.8

= 8.4cm^3√

g) The density of the soil $= \frac{\text{Mass}}{\text{Volume}}$

$= \frac{24.3}{8.4}$√

= 2.893g/cm^3√

22. a) A – Seal and insulator√

B – Zinc case√

C – Mixture of carbon and manganese (IV) oxide√

D – Carrbon rod √

b) Zinc case acts as a negative electrode√

c) i) Polarisation√

Remedy – Adding a depolarizer e.g potassium dichromate√

ii) Local action√

Remedy – By amalgamation√

Accept – use of pure zinc or coating zinc with mercury √